SCIENCE NEWS of the week

Fetal Tissue Grafts Reverse Parkinson's

Five years after researcher's pioneering attempts to use transplants of fetal brain tissue to treat Parkinson's disease – with mostly disappointing results – three new studies indicate that the surgical procedure can ameliorate Parkinson's symptoms and reduce patients' needs for escalating doses of drug therapy.

However, despite enthusiasm about the technique's promise, researchers caution that fetal tissue transplantation is still far from offering a cure for Parkinson's or any other disease. They assert that no one has yet determined the best way to administer such transplants or followed transplant recipients long enough to demonstrate the procedure's long-term risks and benefits.

The results of the new studies are likely to further electrify the already politically charged field of fetal tissue transplantation research, which uses tissue taken from aborted fetuses. While the Bush administration continued a Reagan-era moratorium on the use of federal funds to pay for studies of such transplants (SN: 11/11/89, p.310), many expect President-Elect Bill Clinton to lift the ban following his January inauguration.

Parkinson's disease affects roughly 1 million people in the United States. Symptoms of the disease usually begin with a slight tremor, slowing of voluntary movements, and depression. As Parkinson's progresses, patients develop a characteristic shuffling gait and increasing rigidity. Those with advanced Parkinson's often "freeze" for minutes or hours at a time, sometimes unable even to swallow or open their eyes.

Parkinson's disease results from the unexplained death of cells in the brain that produce dopamine, a key chemical that transmits messages between nerve cells. The only available treatments boost the ability of brain cells to either make or take up dopamine. However, Parkinson's patients must take larger and larger doses of these drugs, until they eventually develop involuntary jerking movements – side effects that some consider worse than the disease itself.

In the first of the new reports – all of which appear in the Nov. 26 NEW ENGLAND JOURNAL OF MEDICINE – D. Eugene Redmond Jr. of the Yale University School of Medicine and his colleagues studied the effects of injecting fetal brain tissue into the brains of four Parkinson's patients. For controls, the researchers followed the health of three other patients who had been selected at random to wait one year before having similar surgery.

A year and a half after their surgery, three of the transplant patients could move more freely and resume some of the normal tasks of daily living, such as dressing and feeding themselves, Redmond's group found. (One of the patients died from complications of a stomach feeding tube inserted before the transplant.) In contrast, the controls – who continued to receive medication – maintained their symptoms during their year-long wait.

The second group, led by Curt R. Freed of the University of Colorado Health Sciences Center in Denver, found significant increases in motor function in all seven patients who received transplants of fetal brain tissue. Moreover, Freed's group reports, a positron-emission tomography (PET) scan of one patient revealed that the transplanted tissue was still functioning after nearly three years.

In the third study, Hakan Widner of University Hospital in Lund, Sweden, and his colleagues injected fetal brain tissue into the brains of two patients who developed Parkinson's after injecting themselves with a bad batch of an illicit "designer drug," which killed their dopamine-producing cells. Widner's group reports that both patients regained the ability to care for themselves and walk independently.

In an editorial accompanying the new reports, Stanley Fahn of Columbia University in New York City comments that while many questions remain, the results "will undoubtedly spur optimism." In a second editorial, the journal's top two editors conclude that "there are indeed important benefits to be gained by continuing this work" and call for an end to the federal spending ban. *– C. Ezzell*

New kidney-restoring therapy in sight

The human kidney has the uncommon ability to regenerate damaged tissues. So when acute renal failure strikes – from temporary loss of blood supply, adverse drug reactions, or other causes – physicians maintain their patients' nutrition, fluid levels, and blood pressure and let the body's natural repair systems do the rest. However, supportive therapy is not always successful: Acute renal failure—a common complication of illness and surgery – still contributes to the death of 50,000 people annually.

Now, a study offers compelling evidence that a protein called insulin-like growth factor-I (IGF-I) may eventually provide physicians with the first active therapy for acute renal failure. Such treatment would accelerate the natural healing process, shorten hospital stays, and reduce the death rate in hospitalized patients who develop acute kidney failure.

Nephrologist Steven B. Miller of the Washington University School of Medicine in St. Louis described this research, which will appear in the Dec. 15 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, at last week's meeting of the American Society of Nephrology in Baltimore, Md.

In the study, Miller induced the same type of tissue damage in rats that causes most hospital-acquired renal failure in humans. He then treated the animals with several growth factors – proteins that stimulate cells to divide, enlarge, or differentiate.

Miller observed that IGF-I and one of the other growth factors, epidermal growth factor (EGF), shortened the animals' recovery period. Both proteins also reduced the number of animals that died from their injuries. Only IGF-I alleviated the physical wasting that accompanies renal failure.

This is not the sole, nor the most important, advantage of IGF-I over EGF, Miller says. Previous research has already shown that the drug can be safely administered to humans systemically, for example in the form of a pill or injection. Right now, this does not seem to be true of EGF, which actually *decreases* kidney function when given to healthy animals or humans, Miller notes. Scientists have also found EGF receptors on certain human tumors. Nobody knows whether such tumors would grow or shrink in the presence of EGF, he says.

Miller expects that positive results from current research, including his own, will continue to increase IGF-I's chances of entering human clinical trials. "IGF-I is far ahead of the game," he says. "We're closer to being able to apply this clinically since it's already been used in people."

Based on the strength of the rat studies and on IGF-I's history of safe use in humans, Miller speculates that clinical tests of the protein for treating acute renal failure could begin soon. He and his colleagues have drawn up an experimental protocol for such a trial and have discussed the possibility with Genentech, Inc., the San Francisco-based biotechnology company that supplied the IGF-I used in the experiments. "We'd like to believe human trials could start within a year," he says, "but I don't know that as a fact." *– D. Pendick*